



## The Physical Health of Students of Hohhot No.36 Middle School, Inner Mongolia, China

Xiao Jianwei

Inner Mongolia Honder College of Arts and Sciences, Hohhot 010070, China

Email: 270779595@qq.com

**Abstract:** The physical health of students is crucial for their overall well-being, academic performance, and future prospects. This study aims to assess the physical health of students from Hohhot No.36 Middle School in Inner Mongolia, China. Data from 120 students were collected through physical fitness tests conducted from November 2015 to April 2016. The research objectives were to compare the students' physical fitness scores with the national average levels from 2014 and identify areas for improvement. The results indicate that the height and weight of both male and female students were higher than the national averages. However, the obesity rate was also higher than the national standard. The students' performance in the 50-meter sprint and endurance running (800/1000 meters) was below the national average. Additionally, the standing long jump, pull-ups, and sit-ups scores were lower than the national averages. Based on the findings, recommendations are proposed to improve the students' physical fitness. These include nutritional guidelines, exercises to increase height and lung capacity, methods to enhance sprinting and endurance running, exercises to improve standing long jump, and techniques to strengthen pull-ups and sit-ups.

**Keywords:** high school students; physical health; investigation and study

### Introduction

Physical health is of utmost importance for students as it has a direct impact on their overall well-being, academic performance, and future prospects<sup>[1]</sup>. Regular exercise and a healthy diet can enhance a student's physical fitness, improve their immune system, and reduce the risk of developing chronic illnesses, such as obesity, diabetes, and heart disease. When students are physically fit, they are better equipped to handle the demands of school and daily life, as they have more energy and stamina, better concentration and memory, and improved mental health. Furthermore, physical activity has been shown to reduce stress, anxiety, and depression, which are common among students, especially during exam periods<sup>[2]</sup>. By prioritizing physical health, students can also develop healthy habits that will serve them well throughout their lives, leading to a better quality of life, improved job prospects, and reduced healthcare costs<sup>[3]</sup>.

In China, the physical health of students has been a major concern for many years, as evidenced by statistics from the Ministry of Education showing that many Chinese students have experienced declining physical fitness, increasing obesity rates, and high rates of myopia<sup>[4]</sup>.

To address this issue, the Chinese government and local authorities have implemented a range of measures, such as promoting physical activity, improving diet, and enhancing the quality of education<sup>[5]</sup>. Schools have also begun to place greater emphasis on physical exercise, strengthening physical education curriculums, providing various sports facilities and equipment, and encouraging students to participate in physical activities<sup>[6]</sup>.

Compared with 2010, the physical development level of Chinese students in 2014, including height, weight, and lung capacity, has improved. Lung capacity continued to rise after the turning point in 2010. Although the physical fitness of middle school students is on the rise, the obesity rate has also increased compared to 2010, and the increase in weight is greater than that of height. Schools and parents should attach great importance to students' physical health and prioritize the idea of "health first"<sup>[7]</sup>. From November 2015 to April 2016, the author obtained physical health test scores of 120 students from Hohhot No.36 Middle School to understand the physical health status of students in Hohhot. By comparing with national standards, this study analyzed students' health status and proposed improvement plans to jointly promote students' physical fitness.

### Research Objectives and Methods

#### 1.1 Research Objectives

The physical fitness test scores of 120 students from two classes selected from Hohhot No.36 Middle School.

#### 1.2 Research Methods

##### 1.2.1 Literature Review Method

This study reviewed the results of the national student physical health surveys in 2010 and 2014 and the national physical fitness monitoring reports in 2010 and 2014 to understand the average level of student physical fitness tests in 2010 and 2014. The test scores of the 120 selected students were compared with the national average level in 2014.

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The study also referred to other content such as "Training Methods to Improve the Standing Long Jump Score for High School Students Taking Physical Examinations" and "How to Quickly Improve the Pull-up Scores of Middle School Students" published in 2013<sup>[8]</sup>.

### 1.2.2 Testing Method

From November to December 2015, the author and another intern teacher conducted physical health tests on 120 students from two classes selected from Hohhot No.36 Middle School. The testing equipment is shown in Table 1.

Table 1: Equipment used in the physical health test of Hohhot No.36 Middle School students.

Test	Instrument
Lung capacity	Spirometer
Height	Stadiometer
Weight	Weighing scale
50-meter dash	Stopwatch
Sit and reach	Stopwatch
Standing broad	Jump Measuring tape
Pull-ups (boys)	Stopwatch, Hand counter
Sit-ups (girls)	Stopwatch, Hand counter
1000-meter run	Stopwatch, Hand counter
800-meter run	Stopwatch, Hand counter

### 1.2.3 Statistical Analysis Method

The physical fitness test scores of 120 students from Hohhot No.36 Middle School were compared with the average level and standard deviation of the 2014 national physical fitness test for middle school students using mathematical and statistical methods. The physical fitness and health status of Hohhot No.36 Middle School students were evaluated, and improvement measures were proposed.

Table 2: measure of class 8 and 10

Measure	Class	Number of Students
Height	8	60
	10	60
Weight	8	60
	10	60
Lung Capacity	8	60
	10	60

## 2 Results and Analysis

### 2.1 Comparison of Student Body Shape with the 2014 National Middle School Student Test Average

Table 3 Comparison of Student Body Shape with the 2014 National Middle School Student Test Average (120 people)

Measure	Gender	National Average (cm/kg/L)	National Standard Deviation (cm/kg/L)	School Average (cm/kg/L)	School Standard Deviation (cm/kg/L)
Height	Male	166.5	24.5	163.4	14
	Female	158.5	24.5	163.4	14
Weight	Male	56.2	15.5	53.5	11.8
	Female	50.4	15.5	53.5	11.8
Lung Capacity	Male	3045.1	624.1	2291	425.4
	Female	2261.1	624.1	2291	425.4

From Table 3, it can be seen that the average height of male students is 0.4 cm higher than the national average, and the average height of female students is 4.9 cm higher than the national average. This indicates that both male and

female students from Hohhot No. 36 Middle School have higher height than the national average. Compared with 2014, the increase in the height of female students is faster than that of male students, indicating that the height-to-weight ratio of female students is more balanced than that of male students, and the obesity rate is also lower than that of male students.

From Table 3, it can be seen that the average weight of male students is 5.6 kg higher than the national average, and the average weight of female students is 3.1 kg higher than the national average. This indicates that both male and female students from Hohhot No. 36 Middle School have higher weight than the national average. Compared with 2014, the obesity rate of both male and female students is higher than the national standard.

From Table 3, it can be seen that the average lung capacity of male students is 1010 higher than the national average, and the average lung capacity of female students is 30 higher than the national average. This indicates that both male and female students from Hohhot No. 36 Middle School have higher lung capacity than the national average. Compared with 2014, the increase in lung capacity of male students is faster than that of female students, indicating that male students often engage in sports.

From Table 3, it can be seen that the average height, weight, and lung capacity of both male and female students are higher than the national average, indicating that the performance of both male and female students in terms of height, weight, and lung capacity at Hohhot No. 36 Middle School is higher than the national average. The weight of both male and female students exceeds the national average, but weight is a measure of obesity, so students' weight is above the standard.

## 2.2 Comparison of Student Physical Fitness with the 2014 National Average

Table 4: Comparison of Student Physical Fitness with the 2014 National Average (120 people)

Test	Male/Female	Number of Participants	National Average	Average	Standard Deviation
Class Size	Mixed	-	-	-	-
National Population	Mixed	120	308725	-	-
Height	Male	60	166.5	163.4	24.5
	Female	60	158.5	166.9	14
Weight	Male	60	56.2	53.5	15.5
	Female	60	50.4	61.8	11.8
Lung Capacity	Male	60	3045.1	2291	624.1
	Female	60	2261.1	3155	425.4
50m Sprint	Male	60	8.2	9.2	1
	Female	60	9.6	8.7	1
800m/1000m Run	Male	60	281	273	1
	Female	60	261	350	0.1
Sit and Reach	Male	60	7.2	13.6	6.1
	Female	60	11.5	9.7	5.7
Standing Long Jump	Male	60	198.5	151	0.2
	Female	60	159.5	196	0.1
Pull-ups/Sit-ups	Male	60	2.7	-	2.5
	Female	60	30	-	10.1

From Table 4, it can be seen that the average level of boys' 50-meter performance is lower than the national average level by 0.5 seconds, and the average level of girls' 50-meter performance is higher than the national average level by 0.4 seconds. Boys' 50-meter performance is below the national level, while girls' performance is above the national level. Girls' height, weight, and overall performance are better than boys', and in general, the proportion of girls' height to weight is more coordinated than boys'. Height and weight also have a significant impact on speed. Girls' overall level is higher than the national standard.

From Table 4, it can be seen that the average level of boys' 1000-meter performance is 69 seconds lower than the national average level, and the average level of girls' 800-meter performance is 12 seconds lower than the national average level. Both boys and girls have poor endurance, but girls' performance is slightly better than boys'. The mean

and standard deviation of girls' lung capacity are lower than boys'. The obesity rate among boys is significantly higher than girls, and boys' overall level is lower than girls'.

From Table 4, it can be seen that the average level of boys' sit-and-reach performance is 2.5 cm higher than the national average level, and the average level of girls' sit-and-reach performance is 2.1 cm higher than the national average level. Girls are more flexible than boys, but the boys' level is higher than the girls' level in the above table.

From Table 4, it can be seen that the average level of boys' standing long jump performance is 2.5 cm lower than the national average level, and the average level of girls' standing long jump performance is 8.5 cm lower than the national average level. Boys' performance is slightly better than girls', indicating that girls' lower limb strength is underdeveloped, and boys' lower limb strength is better than girls'. Both boys' and girls' overall levels are lower than the national level.

From Table 4, it can be seen that the average level of boys' pull-up performance is 0.5 lower than the national average level, and the average level of girls' sit-up performance is 2.8 lower than the national average level. Many people still fail to achieve the pull-up performance standards, and boys need to practice upper limb strength, while girls need to practice waist and abdominal muscle strength. Both boys and girls' overall levels are lower than the national level.

From Table 4, it can be seen that only the sit-and-reach score is reached by both boys and girls in the students' physical fitness. The remaining four items are not met by both boys and girls. In this test, it reflects the standard level of physical fitness testing of students from Hohhot No. 36 Middle School. Apart from the sit-and-reach, students should master the techniques of the other four test items as soon as possible and strengthen their practice.

### **3.1 Conclusion and Suggestions**

#### **3.1.1 Student Morphological Analysis**

From Table 3, it can be seen that the average level of boys' height is 0.4 cm higher than the national average level, and the average level of girls' height is 4.9 cm higher than the national average level. It shows that the height of both boys and girls at Hohhot No. 36 Middle School is higher than the national average level.

From Table 3, it can be seen that the average level of boys' weight is 5.6 kg higher than the national average level, and the average level of girls' weight is 3.1 kg

#### **3.1.2 Analysis of the 50m Performance of Students**

As can be seen from Table 4, the average level of male students' 50m performance is 0.5 seconds lower than the national average, while the average level of female students' 50m performance is 0.4 seconds higher than the national average. This indicates that the 50m performance of female students from Hohhot No. 36 Middle School is higher than the national average, while the 50m performance of male students is lower than the national level.

#### **3.1.3 Analysis of the 800/1000m Performance of Students**

From Table 4, it can be seen that the average level of male students' 1000m performance is 69 seconds lower than the national average, while the average level of female students' 800m performance is 12 seconds lower than the national average. This indicates that both the 800m performance of female students and the 1000m performance of male students from Hohhot No. 36 Middle School are lower than the national average.

#### **3.1.4 Analysis of the Sit and Reach Test Scores of Students**

As can be seen from Table 4, the average level of male students' sit and reach test scores is 2.5cm higher than the national average, while the average level of female students' sit and reach test scores is 2.1cm higher than the national average. This indicates that both male and female students from Hohhot No. 36 Middle School have sit and reach test scores that are higher than the national average.

#### **3.1.5 Analysis of the Standing Long Jump Performance of Students**

From Table 4, it can be seen that the average level of male students' standing long jump performance is 2.5cm lower than the national average, while the average level of female students' standing long jump performance is 8.5cm lower than the national average. This indicates that both male and female students from Hohhot No. 36 Middle School have standing long jump performances that are lower than the national average.

#### **3.1.6 Analysis of the Pull-up and Sit-up Performance of Students**

As can be seen from Table 4, the average level of male students' pull-up performance is 0.5 lower than the national average, while the average level of female students' sit-up performance is 2.8 lower than the national average. This indicates that both the pull-up performance of male students and the sit-up performance of female students from Hohhot No. 36 Middle School are lower than the national average.

Overall, out of the 120 students from Hohhot No. 36 Middle School who were selected for this test, only one item of the students' physical fitness performance was higher than the national average for both male and female students. Among the five tests, only the sit and reach test was passed by all students, while the remaining four tests showed lower scores than the national average. In terms of physical fitness, most of the students' performance was unsatisfactory. The average level of the students' physical fitness test was lower than the national average for middle school students.

### **3.2 Recommendations**

#### **3.2.1 Methods for Improving Student Physical Form Information**

At this stage of growth, students require various nutrients to develop properly. It is recommended to consume less fat and fried foods and to intake more protein, vitamins, and other essential nutrients. Students should also reduce their dinner intake, exercise regularly, and combine exercise with dieting.

Methods for Increasing Height:

Staple foods such as rice and noodles are the body's energy source. Daily intake should be ensured, and fatty foods should be avoided as much as possible. It is also recommended to diversify food intake, and to minimize the intake of sweet foods, which can hinder a child's growth.

Parents should provide children with sufficient calcium to support their normal growth (milk is the ideal source of calcium).

Protein is the main raw material for growth and development. It should be provided daily, and is found primarily in animal products such as lean meat, with soy products being an ideal source of high-quality protein.

Exercise is one of the methods for increasing height. Basketball players tend to be taller, and playing badminton or jump rope can also help with height. Therefore, everyone should engage in exercise regularly.

Methods for Improving Lung Capacity:

Jogging, yoga, jump rope, basketball, soccer, shuttle runs, and other activities can improve lung capacity. However, it requires long-term persistence to be effective. It is recommended to practice chest expansion and arm vibration exercises for at least 3 minutes daily. Endurance running should also be practiced with appropriate running and breathing coordination, suitable distance, and moderate intensity. Blowing up balloons can also be beneficial.

3.2.2 Methods for Improving 50-Meter Performance:

Improving 50-meter performance requires coordinated movement of the upper and lower limbs, with rapid arm and leg swings. Short-distance sprints, such as 20-40 meter runs, 4x25-50 meter relay runs, acceleration runs, and chase runs, should be practiced. Various short distance variable-speed running exercises can also be useful. It is important to increase muscle strength and explosiveness.

3.2.3 Methods for Improving Standing Long Jump Performance:

It is recommended to engage in more lower limb strength training, such as frog jumps, squats, step jumps, vertical jumps, single-leg exchanges, chest thrusts, and jumping exercises. Alternatively, practicing standing jumps regularly can also be helpful in improving leg strength, which is fundamental to standing long jump performance.

3.2.4 Methods to Improve 800/1000-Meter Performance

Endurance running requires the combination of running and breathing, and lung capacity is an important factor in endurance running. To improve endurance running, one should practice timed and measured running without becoming too breathless. To improve 800/1000-meter mid-distance running, females can alternate between 600 and 900 meters, while also interspersing some strength training. Males can practice 1200-meter mid-distance running. After the body gradually adapts to the distance, the force can be balanced and the test will not be as difficult to complete.

3.2.5 Methods to Improve Sit-and-Reach

To improve sit-and-reach, stretching should be used. There are many stretching methods, such as static stretching, dynamic stretching, and assisted stretching. Students can stretch themselves or help each other stretch, either after warming up or after exercise. Static stretching involves holding onto the ankles with both hands and bringing the body closer to the legs. Dynamic stretching involves quickly stretching the muscles and returning to the starting position. Assisted stretching involves one person stretching while another assists by pressing on the shoulders or back. This method can be used by both males and females.

3.2.6 Methods to Improve Pull-ups and Sit-ups

To improve pull-ups:

Arm-bent pull-ups: The height of the single bar is the same as the student's height. Both hands hold the bar and pull up. Pause for 3-5 seconds after passing the chin over the bar, then do the next exercise. (Practice until it is uncomfortable)

Ground-assisted pull-ups: The height of the single bar is the same as the student's tiptoed height. Both arms are straight, and both hands hold the bar. When practicing, slightly push off the ground and quickly pull both arms upward. Same as the previous exercise. (Practice until it is uncomfortable)

Sit-ups are a method of practicing abdominal muscles. Improving the strength of the waist and abdominal muscles can increase the number of sit-ups. Exercises like curl-ups and planks can strengthen the abdominal muscles. Curl-ups involve quickly raising and lowering the upper body, while planks involve maintaining a straight line with four supporting points: two feet and two forearms.

## Summary

The study reveals important insights into the physical health status of students at Hohhot No. 36 Middle School in Inner Mongolia, China. While the students demonstrated higher average height and weight compared to national averages, their overall physical fitness levels were lower, and the obesity rate was higher. The findings emphasize the urgent need to prioritize physical education and increase physical activity opportunities for students to improve their health and well-being. The paper provides valuable recommendations to enhance specific aspects of physical fitness, including nutrition, exercise, and targeted training. By taking these measures seriously, schools and parents can play a

vital role in promoting a healthier and more active student population, ultimately contributing to better academic performance and brighter future prospects for the students.

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